CROSSING BOUNDARIES: LECTURERS' PERSPECTIVES ON THE USE OF WHATSAPP TO SUPPORT TEACHING AND LEARNING IN HIGHER EDUCATION

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ABSTRACT

While literature continues to promote mobile learning and, in particular, the use of mobile phones for teaching and learning in blended and open distance learning (ODL) to bridge the digital divide, many lecturers still struggle to understand and engage with it to support their teaching practices. Using the theoretical notion of 'boundary crossing', this study reflects on how three South African higher educators introduced WhatsApp, a mobile instant messaging application, into their teaching practices, within a blended mode of delivery, both for distance education but also campus-based learners. Following their experiences with using WhatsApp as a boundary object in their engagement with learners, we explore how a pedagogical model, rules of engagement, group ownership and learner profile impacted on their teaching and their students' learning practices. In this article we argue that mobile technology such as WhatsApp can, by acting as a boundary object, assist in in creasing immediacy and connection not only in informal, but also in formal blended and open distance learning contexts, facilitating reflection, coordination, identification and, in some cases, with students' control and ownership, transformation. However, more research is needed to include experiences of students, to explore in more depth the ethical issues of using WhatsApp in particular contexts, and to assess the potential to transfer these findings into larger ODL contexts.

Keywords: WhatsApp, boundary crossing, boundary objects, social media, blended learning, open distance learning, higher education

1. INTRODUCTION

The use of mobile technology in teaching and learning is on the rise globally and locally (Rambe and Bere 2013; Sharples, McAndrew, Weller, Ferguson, Fitzgerald, Hirst, Mor and Gaved 2012). In particular, mobile instant messaging tools such as WhatsApp are being integrated into formal and informal teaching and learning spaces, due to their accessibility and affordability, even more so in developing/resource scarce environments (Bere 2012; Church and De Oliveira 2013; Rambe and Bere 2013; Yeboah and Ewur 2014). However, while literature continues to promote mobile learning and, in particular, the use of mobile phones for teaching and learning, as a solution to bridge the digital divide (Brown and Czerniewicz 2010), many lecturers struggle to understand *how* to integrate it into their teaching practices.

There is ample evidence and research that shows the benefits of using mobile technology to support students' informal learning (Pimmer and Pachler 2014). There is also literature on how to use mobile technology to repackage classroom material for a smaller screen. However, we agree with Pimmer and Pachler (2014, 195), that mobile learning's biggest promise, which is still under-researched, is its application in *formal* teaching and learning practices, which focus on *learner-centred construction of content*, through communication, collaboration and the sharing of multimedia materials in the form of text, audio, images and video (Rambe and Chipunza 2013).

Anecdotal evidence and initial research suggests that WhatsApp may be a promising tool to support communication and collaboration in and outside the classroom, facilitating the crossing of physical and virtual boundaries through its mobility and immediacy. Using the theoretical notion of 'boundary crossing' (Akkerman and Bakker 2011; Akkerman and Van Eijck 2013), this study reflects on how three South African higher educators introduced WhatsApp into their teaching practices, within a blended mode of delivery, both for distance education and campus-based learners. This study represents an attempt to fill the gap in the literature on innovative, student-centred approaches to using mobile devices for both informal and formal learning. Using a case study approach, the three interventions identified were designed as part of a regional staff development programme in the Western Cape on the use of Emerging Technologies in Higher Education.

Following these lecturers' experiences using WhatsApp in their engagements with learners, we explore how the particular approach they chose in terms of using WhatsApp as a boundary object impacted on their teaching and their students' learning practices. This study is thus guided by the following research questions: What are lecturers' perceptions of WhatsApp's potential to support their students' learning, and how did their choice in terms of pedagogical model impact on their learners' boundary learning mechanisms (Akkerman and Bakker 2011)?

This article is structured in the following way: we first introduce literature on the use of mobile technology and in particular mobile instant messaging tools, such as WhatsApp, in Higher Education, then discuss the theoretical notion of boundary crossing and the learning mechanisms that are facilitated through boundary crossing. After describing the methodology and the three case studies that are the focus of this study, we discuss findings through an analytical framework based on Akkerman and Bakker's (2011) boundary mechanisms for learning. Conclusions and recommendations on the use of WhatsApp in teaching and learning conclude this article.

2. LITERATURE REVIEW

The rapid and widespread adoption of computer mediated communication (CMC) in education globally and locally has been one of the more noteworthy developments of the last few decades in the education sector. CMC was first developed as a purely text based messaging service by the military, spreading to the business world before entering the informal social sector through, for instance, SMS, web-based instant messaging tools, such as Yahoo, Hotmail Messenger or mobile instant messaging tools, such as Mxit, the Facebook messenger or, WhatsApp and WeChat (O'Sullivan, Hunt and Lippert 2004).

Recently, significant traction has also been found in the higher education sector (Johnson, Adams Becker, Estrada and Freeman 2014). The overall use of mobile technologies, such as mobile phones and tablets, in teaching and learning, referred to as m-learning, is on the rise globally and locally (Rambe and Bere 2013; Sharples et al. 2012; Yeboah and Ewur 2014). A possible reason for this is that mobile learning allows

for personalised learning anywhere and anytime, while facilitating both 'individual and collaborative learning experiences' (Attewell 2005). Therefore, it highlights the shift from conventional learning settings, which are limited to classroom interaction, to mobile learning settings, which expand learning beyond the classroom (Lui 2007; Rajasingham 2011). For open distance learning (ODL) in particular, which since its inception has been battling with student isolation and lack of student interaction and engagement, the simplicity, ease of access and scalability of mobile technologies such as WhatsApp hold immense promise for students to control their own learning by creating their personal learning environments (Makoe 2012; Veletsianos 2010).

When selecting a suitable mobile leaning tool, numerous variables need to be considered, such as cost issues, reliability, ease of use, expected longevity in the marketplace and probable popularity with the target group (Attewell 2005; Church and De Oliveira 2013; Rambe and Bere 2013). In resource-constrained environments, mobile social media that require little data, such as WhatsApp (a very popular mobile instant messaging app among South African Higher Education students), show potential to heighten student participation and enhance the formation of learning communities for knowledge creation in and outside the classroom (Rambe and Bere 2013). These instant message services enhance face-to-face and non-face-to-face learning environments by acting as virtual hallways where lecturers and students can meet, and where direct communication and learning is facilitated (Herrington, Reeves and Oliver 2010; Nicholson 2002; Makoe 2012; Rambe and Ng'ambi in press).

From an educational perspective, Mcloughlin and Lee (2007) classified instant messaging services such as WhatsApp as discourse facilitation systems with the inherent social affordances of connectivity and social rapport that create spaces of formal and informal learning. We follow Norman's (1988) definition of affordances, given as follows:

> The term affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used. A chair affords ('is for') support and, therefore, affords sitting. A chair can also be carried. (Norman 1988, 9).

However, we also acknowledge Kirschner, Strijbos, Kreijns and Beers' (2004) argument, that affordances can be technological, social and educational. In terms of classification of affordances, we are drawing from the work of Bower (2008, 7), who distinguished between media, spatial, temporal, navigational, emphasis, synthesis and access-control affordances.

WhatsApp's permission-ability (Bower 2008) allows the creation of closed WhatsApp groups, providing safe environments, where academic discussions as well as social dialogue can take place with the lecturer as participant and facilitator/moderator of safety. The share-ability, read-ability, view-ability, listen-ability, write-ability and watch-ability of WhatsApp (Bower 2008) allow the lecturer and students to share course information and classroom feedback, but also to communicate peer-to-peer about

fears and triumphs. Synchronous-ability addresses students' need for quick response assistance from both facilitator and peers. A direct correlation was found between teacher/lecturer immediacy and learner/student cognitive learning, affective learning and motivation (Church and De Oliveira 2013; Witt, Wheeless and Allen 2006).

Despite these benefits of WhatsApp as a learning tool, literature also warns of challenges when using social media and, in particular, mobile technologies in formal and informal learning settings. Issues such as cognitive overload (Church and De Oliviera 2013), its potentially disruptive nature (Bere 2012; Yeboah and Ewur 2014), its limitations in terms of privacy and reliability (Church and De Oliviera 2013), and the importance of managing boundaries between personal and professional lives (Rambe and Bere 2013, Madge, Meek, Wellens and Hooley 2009), should be carefully considered when attempting to integrate such tools into a learning environment.

3. THEORETICAL FRAMEWORK

Mobile learning (and in this case the use of the instant messaging tool WhatsApp) provides opportunities for formal and informal learning to take place within and across various contexts due to the ability for documenting and reflecting on learning experiences across different settings and communities (Pimmer and Groehbiel 2013). Akkerman and Bakker (2011, 133) argue that the ubiquitous nature and mobility of these devices map mobile learning against the notion of boundaries. Two theoretical frameworks, Engeström's cultural historical activity theory (1987) and situated learning theory on communities of practices (Wenger 1998), use the notion of *boundary mechanisms*, namely, social cultural differences that could lead to discontinuity in action or interaction (Akkerman and Bakker 2011). This includes *boundary objects*, that is, particular artefacts associated with the crossing process and that fulfil a bridging function, and the act of *boundary crossing,* or the transition from one territory to another. Boundaries also imply a level of agreement and connection between particular areas that are viewed as related to each other in some way or another. Making connections by crossing boundaries normally involves the integration of knowledge and experience from two different settings, constructing new knowledge in the process (Dillon 2008). Pimmer and Groehbiel (2013) suggest that social mobile technologies cross boundaries in various ways, for example, across cultures, locations, time, formal and informal learning, and through professional levels, be they novice or expert. It allows for the acknowledgement that learners are often obliged to cross from one territory to an unfamiliar one − whether it is professional, socio-cultural or academic in nature (Akkerman and Bakker 2011; Dillon 2008). Examples of this include the potential of social mobile media to cross boundaries between formal (school/universities) and informal work-based learning environments and the connection of professionals working in isolation in rural areas (Pimmer and Pachler 2014).

However, reference to boundary objects and boundary crossing does not necessarily clarify how learning takes place, nor does it expand on the boundaries' learning potentials (Akkerman and Bakker 2011). For instance, Pimmer and Groehbiel (2013) point out that mobile technologies do not automatically serve as boundary objects, but due to a 'shared representation on social media' they could support the boundary mechanisms, as outlined by Akkerman and Bakker (2011).

This calls for a closer inspection of the learning potential of boundary crossing. Akkerman and Bakker (2011, 142−150) identify the following *four boundary learning mechanisms* as tools to understand and describe learning taking place at boundaries: identification, coordination, reflection and transformation. We utilise this framework when analysing the case studies described below.

Table 1:   Summary of Akkerman and Bakker's boundary learning mechanism (2011)

Boundary mechanisms of learning	Common learning processes
Identification Different sites are questioned and accordingly redesigned. The emphasis remains on a new awareness of practices and redevelopment of existing identities.	*Othering* Comparison of one practice with another to identify differences. *Legitimate coexistence* Working in different groups and/or sites and considering interference and expectations of a number of relationships in different groups.
Coordination The focus remains on overcoming a boundary for continuity to take place, by means of unforced movement between sites.	*Communicative connection* Using boundary objects to be shared by various role players. It could be interpreted differently by different role players. *Efforts of translation* Boundary objects could be used to translate aspects in different sites and to address the multiplicity of different sense makings. *Enhancing boundary permeability* Role players are unaware of the different practices due to effortless exchanges and lack of considered choice and effort. *Routinisation* Practices take place routinely with little or no disagreement.
Reflection A developed set of viewpoints contributing to the development of a new identity that could potentially inform future endeavours.	*Perspective making* Clearly indicating knowledge and understanding of a certain topic. *Perspective taking* Reflecting on one's own knowledge and considering others' perspectives.

Boundary mechanisms of learning	Common learning processes
Transformation This contributes to the development of new practices, which often results in the emergence of 'in-between' practices that are often called boundary practices.	*Confrontation* A specific challenge or problem forces different sites to consider their current practices and relationships. *Recognising a shared problem space* Often a shared problem is identified as a result of the confrontation. *Hybridisation* A new cultural form is developed as a result of the shared problem space. Aspects of different spaces are combined to create a hybrid that is completely new. *Crystallisation* Something that has been created during hybridisation is embedded in practice. Continuous joint work at the boundary. Contradiction in terms of moving towards a new site through hybridisation, but equally preserving the integrity of the original site.

4. METHODOLOGY

This study is set within a qualitative research paradigm. It follows a multiple case study approach (Merriam 1998; Stark and Torrance 2005), focusing on three interventions that lecturers in Higher Education institutions in the Western Cape designed as part of a regional staff development course on the use of Emerging Technologies for Higher Education. Data were collected in a focus group discussion at the end of the regional staff development course in which all of the three lecturers took part and in two follow-up interviews with these lecturers. Further data sources were participants' case studies and their personal reflections, which were part of the course assignments. Interviews were recorded, transcribed and coded thematically using the qualitative software program Atlas TI by the first two authors and mapped against Akkerman and Bakker's (2011) boundary learning mechanisms as an analytical framework. Authors 1 and 2 were facilitators on the regional staff development course, while authors 3 to 5 were participants. Their three interventions form the basis of this study, namely, the three case studies that were analysed. This allowed participants to conduct repeated checks while writing this article. Permission to conduct research was sought through the University of Western Cape as leading institution in the regional staff development programme, and study participants (the three lecturers) gave informed consent. As this study focuses on lecturers' perspectives on the use of WhatsApp, no data were collected from their students. Lengthy quotes are included in the findings to foreground the lecturers' voices and perceptions on WhatsApp as a teaching and learning tool.

5. CASE STUDIES

This article is based on three case studies designed by participants in a regional staff development programme. While all three decided to build their blended learning intervention around the use of WhatsApp, their contexts, learners and models of integrating WhatsApp differed. What follows is a short description of each intervention.

Case study 1 is based at the Stellenbosch University Centre for Pedagogy (SUNCEP). Lecturer 1 introduced WhatsApp in a regional accredited teacher professional learning short course for 36 in-service, qualified Natural Sciences teachers from the Eden Karoo district. Teachers have limited access to the internet via their schools − only during school hours and usually only in the computer laboratory. About half the group has some access to internet at home, but very little data and, as many live in rural areas, internet connectivity can be very erratic. However, most teachers have smart phones. Lecturer 1 thus decided to introduce WhatsApp as a means to continue engagement with her learners in-between face-to-face meetings, and increase the transfer of skills and content knowledge obtained during the course in addition to their classroom practice. The WhatsApp group was set up by the lecturer, with limited rules of engagement in terms of, for example, content of engagement (academic vs. social) or times of engagement. Participants were introduced to WhatsApp during their first face-to-face workshops, and used the group to share information on assignments, join conversations, answer participant questions and ask open-ended, course related questions.

Case study 2 is set in the Faculty of Dentistry at the University of Western Cape. As this second-year undergraduate course consists of limited contact time (1.5−2hrs per week) the lecturer addressed this particular challenge by introducing a WhatsApp group to encourage interactive engagement between teacher/student and peers outside the classroom. The WhatsApp group was set up by the class representative who added her 23 peers to the group. As she had previously set up a WhatsApp group for more informal communication, this group was focused on academic discussions only. The lecturer posed daily questions on WhatsApp on content covered in class and students answered. The WhatsApp group was also used to clarify logistical issues. The lecturer set up certain ground rules, for example, for response time and online presence (i.e. she muted her WhatsApp group between 8pm−8am).

Case study 3 is part of a blended learning course on Leaders for Learning: Lifelong Learning and National Qualifications Frameworks at the University of Western Cape, which consists of two four-day intensive face-to-face sessions and online learning over an eight month period. As these postgraduate students from South Africa and Botswana are middle managers within the education and training systems, they have to juggle various responsibilities and have limited time to engage in coursework. There are 10 students on the current course and all own smart phones. The lecturer set up the WhatsApp group to share information about deadlines; to send out words of encouragement; to have them able to do the same for one another; to share resources with each another; to keep them

connected through their phones − in short to encourage collaborative learning. There were no rules around content to be discussed in the WhatsApp group.

6. FINDINGS AND DISCUSSION

The pedagogical models consciously or subconsciously chosen by the lecturers as described above, in particular spoken or unspoken rules about the content and nature of engagement on WhatsApp, but also learner profile and embeddedness in professional practice, impacted on the range of boundary mechanisms of learning that WhatsApp (as a boundary object) facilitated (Akkerman and Bakker 2011).

Case study 2's primary objective was the facilitation of undergraduate students' engagement with theoretical content beyond the classroom. As the lecturer states, a pre-existing WhatsApp group catered for social communication, so her WhatsApp group was used primarily to engage with questions related to course content, which the lecturer shared on the WhatsApp group. Consequently the boundary mechanism of learning that this lecturer foregrounds are centred around *reflection*, both in terms of *perspective making* and *perspective taking*, allowing students to indicate to their lecturers and their peers their understanding of a topic, but also reflecting on their topic while considering others' perspectives, creating the virtual hallways or informal rendezvous as mentioned in the literature (i.e. Herrington et al. 2010; Rambe and Ng'ambi in press). The following quote exemplifies this:

> I personally don't think it's a difficult course but students seem to struggle with it, especially with the different terms that are used in this particular course ... What I've done now with this WhatsApp group, every day, I would send them a question: What do you think of this?... And you know, what was so amazing was, one person would answer it, and answer it incorrectly, and before I have the chance to correct it, some other person would jump in and say: That is the wrong answer, this is the correct answer. And then they will still ask me: Is that right ma'am? You know? And then ma'am needs to confirm it and then we just carry on.

While the lecturer repeatedly mentions that the focus of her WhatsApp group was academic information and gives examples of how she intervenes, when discussions 'got out of hand', it seems impossible to prevent social communication among students, even more so with technologies that are primarily seen as social, such as WhatsApp (Church and De Oliveira 2013). In the next quote she explains how WhatsApp also filled a *coordinating* function, enhancing both *boundary permeability* and '*routinization'* of communication between her and her students:

> ... and then one day I remember I was so busy at work, I didn't send any questions for discussion and they actually asked me, and this was a little bit more socially, right?: Hi Ma'am, are you sleeping? No questions today? And the other one was on Mother's day, I thought: Why is my phone going off like that? Happy mother's day Ma'am! so I said: You know this is not a social

> tool. And they replied, that they just couldn't help it, they just had to say: Happy Mother's Day
> to me, and then the next day: Are there any questions for us?

It is evident from the lecturer's account that although she did not set up the WhatsApp group, she was instrumental in shaping the conversation and negotiating the group rules. However, she also observes that through the use of WhatsApp her engagement with students became more informal, friendly, building up a feeling of trust and allowing shy students to engage, confirming Rambe and Bere's research findings (2013).

> You know they actually wrote up a nice little letter, thanking me and my other colleague, for
> WhatsApp. In the letter they stated that it really helped them work through their problems, and
> it really helped to establish trust between us. What I liked most was in the class, there were lots
> of quiet introverted students who hardly spoke. With these particular students you would usually
> have to drag something out of them − I have had one or two of those students in the office already
> enquiring about their lack of participation in class. Their response were that they were scared to
> answer because if the answer was incorrect, the other students would make fun of them. Even
> at university level, there are kids who are so silly and scared of what other kids think of them.
> Those same introverted kids actually are the ones who sort of just took the lead on WhatsApp.

Case study 3's lecturer introduced WhatsApp to her students, who were predominantly mature learners embedded in professional practice, as an experiment, as a learning opportunity for herself and her colleague. She 'sold' it to her students as such, in the wake of introducing a range of new tools to keep them engaged through the online phase of their blended learning course, as she explains in the following quote:

> It was the simplicity of WhatsApp that was appealing and because it was already in my life,
> just for sms-ing. I imagined most of our students would be fairly conservative in terms of social
> media, because it's not really what they are into. And they will be ranging in ages from 30−65,
> so I couldn't make the assumption that social media was their thing. But I did think that this
> would be something that we both could stretch, it would be a very gentle stretch for both the
> teaching staff and for the students, and that we would use it mainly for prompting, and you know
> reminding people about deadlines, reminding people that there's certain stuff that's being posted
> on the learning management system and Google docs. What we had to do was in fact, get, almost
> get permission from the students, not in a formal sense but we had to get their buy in, to the fact
> that we were playing with different things, and we might screw up, we don't know, but: are you
> game?

Looking at her account of the WhatsApp innovation, she facilitated mainly the *coordinating* boundary mechanism of learning, as she explains, reminding people, making connections between different platforms and technologies, allowing a more effortless communication between learners that is embedded in highly diverse practices and contexts, but also integrating and weaving conversations and tools through WhatsApp as a boundary object.

> Someone would send a message and say: Listen I'm out in the desert for the next couple of days,
> you know, in Botswana, in the Kalahari, I'm away from contact so I can't get online, I'm going

> to be off for the next while ... [or to just say] where are we now? Ok we are now on Google docs, we are now mainly on the LMS, that also is helping to mediate [learning] ...

Again, while foregrounding the *coordinating* function of WhatsApp as boundary object, in her account the *social* aspect finds its way into the conversation (Pimmer and Groehbiel 2013), exemplified in her description of the pride some of her more mature learners expressed, when impressing their children with their engagement with social media:

> They could then go tell their kids they were using it [WhatsApp]. There are different ways of getting affirmation because I've allowed myself to learn something new, it was helpful to remind me to do certain things at certain times and you know, there was that occasional Happy Birthday! that it was used for, but for the rest, it's been ... like yesterday, another colleague wasn't able to get on to the LMS, so there was some hitch there, you can send a message and say: sorry there's a delay. But this is what's going on, so it's keeping people informed at a distance.

Case study 1's lecturer, who used WhatsApp most extensively in her teaching, and in a very open and non-controlling way, seems to have facilitated all four boundary mechanisms of learning.

She mentions various ways of how WhatsApp helped in *coordinating* communication among her group, to enhance *communicative connection* among her and her learners and connect learners across different practices and contexts.

> We put them on a group before we start so that we can use it to communicate with the teachers to tell them where they should be, when they should be, um what they need, this kind of stuff, um they can also ask questions and they actually quickly start using it to sort out their driving and accommodation, to get there, all those kind of things, but we still use the SMS, bulk SMS system at the same time because we ah, not all of them are on WhatsApp.

Lecturer 1 spends a lot of time describing how WhatsApp facilitated *identification* mechanisms of learning. Her students are often the only teachers teaching their subject at their schools and feel isolated. As Cook, Pachler and Bradley have noted (2008), the WhatsApp group allowed these students to establish relationships beyond schools with teachers in similar contexts and positions, as the following quote shows, and foregrounds the importance of the social conversations on the WhatsApp group, to allow the working in different groups across different sites (*legitimate coexistence),* bridging the gap between formal and informal learning:

> We know they want to communicate socially as well because many of these teachers are really far away from each other, and we found that teachers are really isolated in their classrooms, especially natural science teachers because many of them, this is the only science they are teaching, they might be teaching maths and or they might even be teaching something totally different, English or Life Orientation and they been given a Natural Science class because that's not so difficult, to just give them one class and they feel very isolated because there's nobody else to speak to.

Othering refers to the ability to compare one's own practice with another to identify difference. Lecturer 3 emphasises the need for her students to not just perform 'good practice' when she visits them at school, but to start sharing and reflecting on difficulties they encounter in the classroom when trying to transfer some of the learning into their own practice. She strongly believes that trust between her and her learner is essential to achieve this. She has to be seen as one of them, levelling power differentials and blurring boundaries between teacher/learner relationships. This sense of trust is evident in the following story she relates about one of her learners:

> I've had a teacher sending me a WhatsApp just before she runs into class to say she's totally forgotten this one thing, can I just quickly explain it to her again? (giggles), and it's, it's just that I can, I've got more contact with them, I've got a better idea of what's going on in their schools, going on in their classes, how they experience teaching. So you get to know them, it's not just socially, you get to know them professionally better too, [...] now for example during the exams, you got a very good sense of the ones that jumped in and were marking, and the one who, who`s stressing because he got to mark in the exam, in the holidays.

Without clear spoken rules about content and levels of engagement, the social sometimes may overshadow the academic, but lecturer 1 recounts creative ways of addressing needs of learners on different engagement levels, such as muting conversations or flagging important information with emoticons:

> I think it actually sorted itself very quickly. In the beginning there was, I think they formed a core group of students who are happy to speak anytime of the day, and who speak at midnight with each other, and one or two asked me about it. I have told them to mute the group and those who feel that they only want to join once a week, they muted and once a week they go in and sort of scan through. So I've made a little thing where there's this little icon that shows like an explosion.

Pimmer and Pachler (2014) argue that the most useful way of using mobile technology in teaching and learning, is when students start creating and sharing their own content, which would fall under *reflection* in terms of boundary learning mechanisms. Lecturer 1's students do that, as she explains:

> What we asked them at their last session we had with them, is that they, when they go back to school, when they do something in class, that's different or that they think might be an interesting team practical or something that they want to share with the other teachers, that they then make a video clip of it or at least take photos of what's happening and put it on the group...

In some ways, her case study also shows signs of *transformation*, of actually changing existing professional practices. She relates examples of how her learners started to use the WhatsApp group to support each other's teaching, through the sharing of scarce or innovative resources (Rambe and Chipunza 2013), using the regional curriculum adviser as a means of transporting these resources from school to school:

> And then they started asking each other: Can you send me that worksheet? I like how you did
> that, but how did you do that thing? I don't have iodine; can you please send me some? And they
> figured out − they made a whole issue of getting one of the curriculum advisers to go pick it up
> at one school and bring it to the other school.

Akkerman and Bakker (2011, 146) would consider this *recognising a shared problem space* and the solving of the problem, *hybridisation*, whereby a new cultural form is developed as a result of the shared problem space, leading to the 'creation of a new, in-between practice, sometimes called a boundary practice'.

7. CONCLUSIONS

This study set out to explore three lecturers' perceptions on introducing WhatsApp in their teaching and learning practices and how their selected pedagogical model, group ownership, negotiation of ground rules and the learner profile, impacted on the boundary mechanism of learning. Two of the lecturers used WhatsApp to support blended learning with distance learners and one lecturer used it in an on-campus course. Findings of the study confirm that the accessibility and immediacy of WhatsApp as a mobile technology using learners' mobile phones, helps in facilitating the coordination of learning, blurring physical and geographical boundaries. However, often initiated by the lecturer, WhatsApp can also lead to reflective learning processes, both for perspective making and taking beyond the classroom space. Pedagogical models that exert little control on content and level of engagement in the WhatsApp group have the potential to lead to identification, allowing learners and facilitators to engage in more informal ways, crossing professional and social boundaries. What this study has shown is that the most far reaching impact of WhatsApp, namely the facilitating of transformative learning, as others have noted before (Pimmer and Pachler 2014), may happen when learners take full ownership of the tool, crossing the boundary between academia and professional practice. Here learners create and share resources and experiences and, in the process, construct boundary practices outside their immediate course context.

We thus see WhatsApp as a tool, which not only allows the crossing of boundaries within blended learning contexts, but also through its ubiquity and mobility acts as a 'shepherding' object. It allows learners and facilitators to connect seamlessly across different contexts of their lives, but it also provides some sort of guiding thread, at once physical and virtual, through their learning path, as lecturer 3 explains in this final quote:

> I'm walking down the street and I'm getting a message while I'm busy doing my shopping in
> Pick 'n Pay, and I'm, oh gosh, [lecturer 2] she's just tripped over a dog, aaaaaw shame, poor
> [lecturer 2], whatever she's done, but don't forget your assignment, so that's somewhere, it's the
> physicality of it which is different.

This study emphasises that learning is inherently social (Bandura 1971; Siemens 2005; Wenger 1998), and that even if clear rules of engagement are set up, the formal is

embedded and supported in the social learning process. WhatsApp has the potential to create collective, supportive, collaborative communities of practice (Wenger 1998) where lecturer-student support can evolve and transform over time into a peer-peer network, both in resource-rich and resource-poor contexts. The generosity and resourcefulness of learners and facilitators allow learning networks to develop that enhance students and lecturers' learning experiences, through creativity, humour and social connectedness.

Lectures also report challenges when using WhatsApp. While there is insufficient space here to discuss this in detail, the blurring of boundaries of social and academic life can lead to stress, lack of privacy, and difficulties in the juggling of responsibilities, particularly for mature students (Rambe and Bere 2013), or as Akkerman and Bakker note: 'The cultural differences of practices here lead to a negotiation of different identities, which do not harmoniously coexist' (2011, 142). However, what these case studies have shown is that both lecturers and students find creative ways of addressing some of these challenges, confirming previous research (Church and De Oliveira 2013). The setting of shared and negotiated ground rules seems necessary to establish teaching and learning practices that are sustainable. While negotiation of ground rules may have to be initiated by lecturers, student ownership and control is also important to meet their own learning needs; some of which may not be accessible to lecturers.

In this article we argue that mobile technology such as WhatsApp can, by acting as a boundary object, assists in increasing immediacy and connection not only in informal, but also in formal blended learning contexts (Church and De Oliveira 2013; Pimmer and Groehbiel 2013). It is important to note, that the three case studies identified in this article follow diverse pedagogical models and are set diverse contexts and do not allow for generalisation of findings. Furthermore they each engage comparably small groups of students. A possible transfer of the experiences into large open distance learning contexts warrants further research, as would research focusing on the student experience and a more in-depth exploration of the ethical issues occurring in particular contexts.

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